Deficiency of omega-3 fatty acids (O3FAs) is an often unrecognized determinant of clinical disease.

The adequate availability of these essential nutrients may prevent affliction or facilitate health restoration in some pregnant women and developing offspring.

The human organism requires specific nutrients in order to carry out the molecular processes within cells and tissues and it is well established that O-3FAs are essential lipids necessary for various physiological functions.

Accordingly, to achieve optimal health for patients, caregivers should be familiar with clinical aspects of nutritional science, including the assessment of nutritional status and judicious use of nutrient supplementation.

In view of the mounting evidence implicating O-3FA deficiency as a determinant of various maternal and pediatric afflictions, physicians should consider recommending purified fish oil supplementation during pregnancy and lactation.

Furthermore, O-3FA supplementation may be indicated in selected pediatric situations to promote optimal health among children.

Let food be your medicine and medicine be your food. – Hippocrates

THESE AUTHORS ALSO NOTE:

“In the enlightened age of modern medicine, some individuals are disinclined to believe that various diseases can be prevented or overcome by simply eating the right food.”

In the eighteenth century, “despite much evidence, it took many decades and many deaths before conventional wisdom accepted the findings of Dr James Lind, a Scottish physician with the British Navy, who discovered in about 1750 that two oranges and one lemon every day were enough to overcome scurvy, a disease that consumed more sailors than all other afflictions, naval battles and shipwrecks combined.”
Many health afflictions can be prevented or ameliorated by addressing cellular deficits of essential molecular nutritional ingredients.

Essential fatty acids (EFAs) cannot be synthesized by the body and must be ingested from dietary sources.

EFAs are involved in oxygen transport, energy storage, cell membrane integrity, intercellular communication and the control of inflammation.

There are two groups of EFAs: omega-3 fatty acids (O-3FAs) and omega-6 fatty acids (O-6FAs).

O-6FAs are plentiful in most diets (from cereal grains, most processed foods, meat, milk, eggs and some vegetable oils such as corn, sunflower, safflower and sesame).

Significant quantities of O-3FAs are commonly found only in a few foods including selected seeds and nuts as well as fish.

The "concentration of O-3FAs and O-6FAs consumed in the diet is a matter of major importance to the biochemical and clinical functioning of the individual."

Both O-6 and O-3 fatty acids produce hormone-like substances called eicosanoids, including prostaglandins, leukotrienes and thromboxanes, which regulate many physiological processes.

O-6 eicosanoids promote inflammation and blood clotting.

O-3 eicosanoids facilitate anti-inflammatory action and blood thinning.

Both groups of EFAs compete for the same limited supply of enzymes to assemble eicosanoids. Diets with high O-6FAs / O-3FAs ratios will diminish the effectiveness of O-3FAs-dependent processes, leading to an overabundance of O-6 derived eicosanoids.

"Many chronic disease states are characterized by a relative overabundance of O-6 oils."

A deficiency in O-3FAs is a predisposing factor for unrestricted cell proliferation, blood clotting, inflammation and autoimmune reactions.

When the consumption of O-3FAs and O-6FAs is balanced there is optimal physiologic response in the body.

"The ratio of O-6 to O-3 (6/3 ratio) was about 1–2:1 as recent as 200 years ago in the North American diet and now it is estimated at 16:1."
“The relative deficiency in O-3FAs in the Western diet and the plethora of O-6FAs is yielding a predisposition to a lack of inhibitory eicosanoids, a metabolic milieu which may predispose to certain cancers, cardiovascular affliction, arthritic disorders and various other health challenges.”

Supplementation of O-3FAs improves the 6/3 balance and may “ameliorate various inflammatory diseases and may diminish the risk of numerous common illnesses.”

For patients with various health complaints, a nutritional assessment of EFA status may be considered.

“The health significance of EFA biochemistry is beginning to be appreciated in many areas of medicine. From development of intelligence in utero to managing common pediatric problems such as recurrent ear infections, from amelioration of hostility in young adults to abating various psychiatric disorders and from diminishing the risk of cardiac disease to a role in preventing Alzheimer’s, it is evident that EFAs are necessary at all stages of life.”

Essential fatty acids such as arachadonic acid and docosahexaenoic acid (DHA) are critical for normal development of the placenta and the fetus early in pregnancy and it is now clear that both are also necessary for brain and retina.

Considerable amounts of DHA are transferred from mother to child, particularly throughout the third trimester, and the optimal requirement may not be fulfilled if maternal stores are inadequate.

DHA is the main O-3FA ingredient required for fetal brain development.

Fish oil contains DHA, while plant sources do not have DHA.

“Provision of direct DHA from fish sources is the most secure way to provide the necessary DHA required for optimal fetal neurological development.”

Over the last century, there has been an 80% decline in the intake of O-3FAs.

Hypertension disorders of pregnancy are significantly reduced with higher consumption of O-3FAs.

Adequate consumption of O-3FAs through diet or from supplements may significantly decrease the likelihood of early labor and preterm birth.

4 g daily of fish oil supplementation beginning at 30 weeks gestation was associated with a longer gestational period and increased birth weight.
Postpartum depression is a prevalent and disturbing condition that has tragically consumed the lives of many new mothers, and O-3FAs may be a determinant of mood in the postpartum period.

There is a strong correlation between lower seafood consumption during pregnancy and high rates of postpartum depression.

Lower DHA content in mother's milk correlates with high postpartum depression rates.

"DHA has been proposed as a prophylactic therapy to prevent mood disorders, as a treatment for mild depression and as an adjunct intervention in managing established major depression in the postpartum period."

"An extensive literature suggests substantial benefit to children exposed to sufficient levels of O-3FAs during prenatal development and early post-natal life."

"Adequate maternal levels of O-3FAs appear to have a long-term positive impact on the central nervous system function of the child."

The "children of mothers who consumed cod liver oil (rich in O-3FAs) in late pregnancy and early lactation have improved intelligence quotients and mental processing scores at 4 years of age."

The risk of cerebral palsy in children is significantly diminished with fish intake during pregnancy.

Levels of DHA are significantly lower in autistic children as compared to controls.

O-3FA levels are lower in children with attention-deficit hyperactivity disorder.

Supplementation with fish oil in children with autism improves their general health, motor and cognitive skills, sleep patterns, sociability and eye contact, with reduced frequency of infections, less irritability, less aggression and less hyperactivity.

Children receiving fish oil for 3 months demonstrate remarkable progress in reading skills compared to the controls.

A low intake of O-3FAs results in poor reading, spelling, auditory memory and general ability.

Supplementation with O-3FAs appears to subsequently confer positive health benefits in children.

The use of cod liver oil during pregnancy reduces the risk of developing diabetes in children.
Regular use of cod liver oil in the first year of life is associated with a lower risk of subsequent childhood type-1 diabetes.

There has been a dramatic increase in the consumption of O-6FAs, which promotes fetal adipogenesis and is an important contributor to childhood obesity.

Non-breast-fed infants require EFAs in their feedings.

Increased consumption of O-3FAs in pregnancy and during the post-natal period would benefit the health and well-being of numerous individuals.

Maternal and pediatric O-3FA deficiency is usually a reflection of inadequate consumption of source foods.

Western diets have become increasingly deficient in O-3FAs.

“Dietary intake of fish, a premium source of O-3FAs, has declined substantially over the last few years because of public awareness of widespread seafood contamination.”

“Scientific literature has confirmed escalating aquatic contamination from toxicants such as heavy metals, dioxins, polychlorinated biphenyls (PCBs) and estrogens that have potential to harm the developing child as well as the mother.”

Mercury is very toxic to the fetal brain, and there are now warnings to limit the consumption of seafood in pregnancy because of teratogenic potential.

Therefore, these authors make the following recommendations:
1) Purified (through molecular distillation) O-3FA intake should be supplemented during pregnancy and lactation for optimal fetal and infant brain development.

2) Non-breast-fed infants receive formulas supplemented with DHA to optimize neurodevelopment.

CONCLUSIONS:

O-3FAs are required for optimal development of the neurological system as well as for numerous other functions throughout the body.

The health and well being of the child in the short and long term is “improved by the availability of adequate amounts of O-3FAs during fetal and post-natal development.”

“Deficiency of O-3FAs is a common problem and may be a contributing factor for certain maternal and pediatric health problems; extensive evidence-based data confirm that O-3FA supplementation is associated with improved outcome for mothers and children.”
Untainted fish oil containing abundant O-3FAs should be a routine supplement during pregnancy and lactation.

KEY POINTS FROM DAN MURPHY

1) Deficiency of omega-3 fatty acids is an often unrecognized cause of disease.

2) Essential fatty acids cannot be synthesized by the body and must be ingested.

3) The “concentration of O-3FAs and O-6FAs consumed in the diet is a matter of major importance to the biochemical and clinical functioning of the individual.”

4) O-6 eicosanoids promote inflammation and blood clotting.

5) O-3 eicosanoids facilitate anti-inflammatory action and blood thinning.

6) “Many chronic disease states are caused by an overabundance of O-6 oils.

7) A deficiency in O-3FAs is a predisposing factor for blood clotting, inflammation and autoimmune reactions.

8) “The ratio of O-6 to O-3 (6/3 ratio) was about 1–2:1 as recent as 200 years ago in the North American diet and now it is estimated at 16:1.”

9) “The relative deficiency in O-3FAs in the Western diet and the plethora of O-6FAs is yielding a predisposition to a lack of inhibitory eicanosoids, a metabolic milieu which may predispose to certain cancers, cardiovascular affliction, arthritic disorders and various other health challenges.”

10) Supplementation of O-3FAs improves the 6/3 balance and may “ameliorate various inflammatory diseases and may diminish the risk of numerous common illnesses.”

11) Omega-3 FAs improve the development of intelligence in utero, help common pediatric problems such as recurrent ear infections, help ameliorate hostility in young adults, abate various psychiatric disorders, diminish the risk of cardiac disease, and plays a role in preventing Alzheimer's.

12) Omega-3 EFAs are necessary at all stages of life.

13) DHA is the main O-3FA ingredient required for fetal brain development.

14) “Provision of direct DHA from fish sources is the most secure way to provide the necessary DHA required for optimal fetal neurological development.”

15) Over the last century, there has been an 80% decline in the intake of O-3FAs.
16) Increased omega-3s during pregnancy reduce hypertension disorders, significantly decrease the likelihood of early labor and preterm birth, increase gestational period and birth weight, and reduce postpartum depression.

17) “Adequate maternal levels of O-3FAs appear to have a long-term positive impact on the central nervous system functioning of the child.”

18) The children of mothers who consume O-3FAs have improved intelligence and mental processing.

19) The risk of cerebral palsy in children is significantly diminished with fish intake during pregnancy.

20) DHA levels are significantly lower in autistic children.

21) Omega-3 levels are lower in children with attention-deficit hyperactivity disorder.

22) Supplementation with fish oil in children with autism improves their general health, motor and cognitive skills, sleep patterns, sociability and eye contact, reduces frequency of infections, less irritability, less aggression and less hyperactivity.

23) Children receiving fish oil for 3 months have remarkable progress in reading skills.

24) Omega-3s during pregnancy reduces the risk of developing diabetes in children.

25) Increased omega-6s is an important contributor to childhood obesity.

26) Fish are contaminated with heavy metals (like mercury, which is very toxic to the fetal brain), dioxins, polychlorinated biphenyls and estrogens, so it is best to supplement with omega-3s that have been purified.

27) Omega-3s are required for optimal development of the neurological system as well as for numerous other functions throughout the body.

28) “Extensive evidence-based data confirm that omega-3 supplementation is associated with improved outcome for mothers and children.”

29) Untainted fish oil containing abundant O-3FAs should be a routine supplement during pregnancy and lactation.

30) Physicians should consider recommending purified fish oil supplementation during pregnancy and lactation.